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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/081,308	02/20/2002	Michael Richard Betker	8-8-16	9936

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EXAMINER	
TANG, KENNETH	

ART UNIT	PAPER NUMBER
2195	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/081,308	BETKER ET AL.	
	Examiner	Art Unit	
	Kenneth Tang	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the Amendment filed on 12/16/05. Applicant's arguments have been fully considered but were not found to be persuasive.

2. Claims 1-20 are presented for examination.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2, 5, 7-8, 11, 13-14, 16, and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Kikuchi (US 6,606,715 B1).

4. As to claim 1, Kikuchi teaches a method for establishing a bound on the execution time of an application due to task interference in an instruction cache shared by a plurality of tasks, said method comprising the steps of:

determining a number (block count/boundary of data blocks) of live frames (blocks during execution) of said application that are coexistent during execution of said application *(col. 11, lines 30-67)*; and

establishing said bound based on said number of live frames (block count/boundary of data blocks) *(col. 11, lines 30-67)*.

5. As to claim 2, Kikuchi teaches wherein said number of live frames is a number of cache frames that contain a block that is accessed by said application in the future without an intervening eviction (protection data) *(col. 11, lines 30-67).*

6. As to claim 5, Kikuchi teaches wherein said step of establishing said bound further comprises the step of comparing the sets that contain live frames of said application with sets accessed by an interrupting task to determine a maximum number of live-frames that may be affected by an interrupting task (when interrupt occurs, maximum number of remaining blocks are identified are affected) *(col. 9, lines 51-67 and claim 5).*

7. As to claim 7, it is rejected for the same reasons as stated in the rejection of claim 1. In addition, Kikuchi teaches a memory that stores computer-readable code and a processor *(col. 5, lines 13-42, col. 6, lines 60-67).*

8. As to claims 8, it is rejected for the same reasons as stated in the rejections of claim 2.

9. As to claim 13, it is rejected for the same reasons as stated in the rejection of claim 7.

10. As to claims 14, it is rejected for the same reasons as stated in the rejections of claim 5.

11. As to claim 16, it is rejected for the same reasons as stated in the rejection of claim 1.

12. As to claim 19, it is rejected for the same reasons as stated in the rejections of claim 5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 3, 9, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi (US 6,606,715 B1) in view of Hwu et al. (hereinafter Hwu) (US 6,681,387 B1).

14. As to claim 3, Kikuchi fails to explicitly teach wherein said number of live frames is determined by a post-execution analysis of cache access patterns of said application. However, Hwu teaches detecting and monitoring usage patterns of the data elements in a cache line after access *(col. 3, lines 27-54)*. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the feature of said number of live frames is determined by a post-execution analysis of cache access patterns of said application to the existing caching system of Kikuchi for the reason of improving run time performance *(col. 1, lines 25-67 and col. 3, lines 27-54)*.

15. As to claims 9 and 17, they are rejected for the same reasons as stated in the rejection of claim 3.

16. **Claims 4, 6, 10, 12, 15, 18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi (US 6,606,715 B1) in view of Borg et al. (hereinafter Borg) (US 5,274,811).**

17. As to claim 4, Kikuchi teaches wherein said number of live frames is determined by a run-time analysis of cache access pattems of a simulation of said application. However, Borg teaches a cache simulation routine to analyze memory access patterns of a cache *(see Abstract, etc.)*. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the feature of said number of live frames is determined by a run-time analysis of cache access pattems of a simulation of said application to the existing caching system of Kikuchi because this would allow for improved system performance and the ability to evaluate different cache designs *(col. 1, lines 14-21 and col. 2, lines 32-43, etc.)*.

18. As to claim 6, Kikuchi teaches wherein said step of establishing a bound and using interrupts *(see rejection of claims 1 and 5)*. Kikuchi fails to explicitly teach determining an effect of an interrupt at each possible interrupt point and establishing said bound based on a maximum of said effect of an interrupt at each possible interrupt point. However, Borg teaches analyzing every cache access pattern after each intermittent interrupt on an ongoing basis. It

would have been obvious to one of ordinary skill in the art at the time the invention was made to include the feature of determining an effect of an interrupt at each possible interrupt point and establishing said bound based on a maximum of said effect of an interrupt at each possible interrupt point to the existing caching system of Kikuchi because this would allow for improved system performance, the ability to evaluate different cache designs, and to avoid longer analyzing at a later time (because of analyzing in small but frequent pieces) *(col. 1, lines 14-21 and col. 2, lines 32-43, col. 2, lines 32-43, etc.)*.

19. As to claims 10 and 18, they are rejected for the same reasons as stated in the rejection of claim 4.

20. As to claims 12, 15, and 20, they are rejected for the same reasons as stated in the rejection of claim 6.

Response to Arguments

21. During patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969).

22. Applicant argues on page 9 of the Remarks that Kikuchi does not address the issue of establishing a bound on the execution time of an application due to task interference in a shared instruction cache, as required by the claims of the present invention.

In response to applicant's arguments, the recitation "establishing a bound on the execution time of an application due to task interference in a shared instruction cache" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

23. On page 9 of the response, it is stated that Applicant could not find a disclosure or suggestion by Kikuchi of lives frames, of determining a number of live frames of said application that are coexistent during execution of said application; and of establishing said bound based on said number of live frames.

Kikuchi teaches determining a number (block count/boundary of data blocks) of live frames (blocks during execution) of said application that are coexistent during execution of said application *(col. 11, lines 30-67)*; and establishing said bound based on said number of live frames (block count/boundary of data blocks) *(col. 11, lines 30-67)*.

The foundation of the Applicant's arguments lie on the weighted definition of a "live cache frame". In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "a cache frame contains a block that is accessed in the future without an intervening eviction") are not recited in the rejected claim(s). Although the claims are interpreted in light of the

specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The broadest reasonable interpretation of a live cache frame is merely a data block in cache. The specification does not contradict this broadest reasonable interpretation of the term. The Examiner recommends to further limit the "live cache frame" in the claims.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth Tang whose telephone number is (571) 272-3772. The examiner can normally be reached on 8:30AM - 6:00PM, Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kt
1/10/05

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